

UNITED STATES PATENT AND TRADEMARK OFFICE  
**CERTIFICATE OF CORRECTION**

PATENT NO. : 7,642,219 B2  
APPLICATION NO. : 10/586171  
DATED : January 5, 2010  
INVENTOR(S) : Tsuaki Odaka et al.

Page 1 of 5

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Delete the title page and substitute therefore the attached title page showing corrected number of claims in patent.

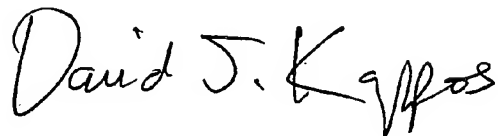
Columns 55 and 56

Delete claims 1-16 and substitute therefore the attached corrected claims 1-13.

This certificate supersedes the Certificate of Correction issued March 30, 2010.

Signed and Sealed this

\*\* Day of \*\*, 2009

A handwritten signature in black ink that reads "David J. Kappos". The signature is written in a cursive, flowing style.

David J. Kappos  
*Director of the United States Patent and Trademark Office*

(12) **United States Patent**  
**Odaka et al.**

(10) **Patent No.:** **US 7,642,219 B2**  
(45) **Date of Patent:** **Jan. 5, 2010**

(54) **THERMAL TRANSFER SHEET**

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(\*) Notice: Subject to any disclaimer, the term of this  
patent is extended or adjusted under 35  
U.S.C. 154(b) by 179 days.

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§ 371 (c)(1),  
(2), (4) Date: **Jul. 17, 2006**

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PCT Pub. Date: **Jul. 28, 2005**

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(51) **Int. Cl.**

**B41M 5/50** (2006.01)

**B41M 5/42** (2006.01)

(52) **U.S. Cl.** 503/227; 428/32.81

(58) **Field of Classification Search** None  
See application file for complete search history.

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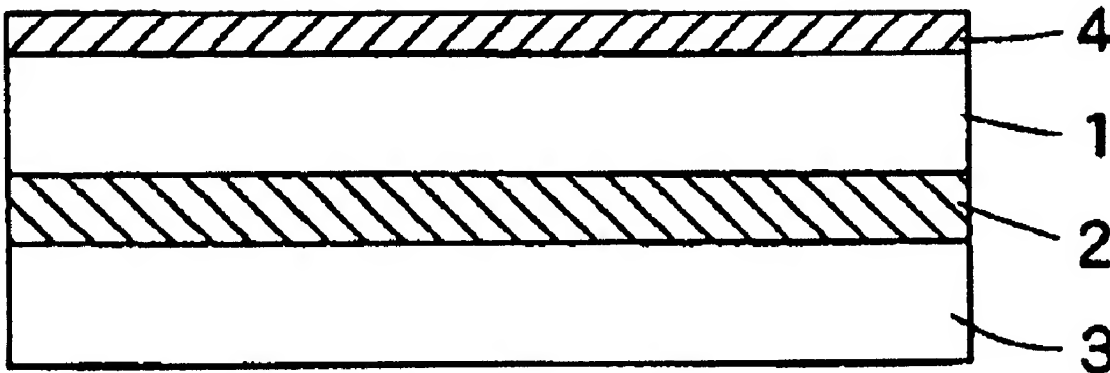
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(57) **ABSTRACT**

Disclosed is a thermal transfer sheet that can meet demands for increased printing speed in thermal transfer, higher density of thermally transferred images, and higher quality. The thermal transfer sheet comprises a substrate and an adhesive layer and a dye layer provided in that order on one side of the substrate, wherein the adhesive layer comprises a polyvinylpyrrolidone resin and a composition for suppressing hygroscopic properties of the polyvinylpyrrolidone resin.

**13 Claims, 1 Drawing Sheet**



1. A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein  
said heat resistant slip layer is provided on one side of said substrate,  
said adhesive layer and said dye layer are provided in that order on the other side of said substrate, and  
said adhesive layer comprises a polyvinylpyrrolidone resin and a saccharide or a sugar alcohol.
2. The thermal transfer sheet according to claim 1,  
wherein the content of said saccharide or sugar alcohol in said adhesive layer is 5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.
3. The thermal transfer sheet according to claim 1,  
wherein the coverage of the component(s) constituting the adhesive layer is 0.05 to 0.3 g/m<sup>2</sup> on a dry basis of the adhesive layer.
4. A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein  
said heat resistant slip layer is provided on one side of said substrate,  
said adhesive layer and said dye layer are provided in that order on the other side of said substrate, and  
said adhesive layer comprises a polyvinylpyrrolidone resin and a complex forming agent.
5. The thermal transfer sheet according to claim 4,  
wherein the content of said complex forming agent is 0.5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

6. The thermal transfer sheet according to claim 4, wherein the coverage of the component(s) constituting the adhesive layer is 0.05 to 0.3 g/m<sup>2</sup> on a dry basis of the adhesive layer.

7. A thermal transfer sheet comprising: a substrate; a heat resistant slip layer; an adhesive layer; and a dye layer, wherein  
said heat resistant slip layer is provided on one side of said substrate,  
said adhesive layer and said dye layer are provided in that order on the other side of said substrate, and  
said adhesive layer comprises a polyvinylpyrrolidone resin and a modifying agent for modifying said resin, wherein said modifying agent is at least one of carboxymethylcellulose, cellulose acetate, cellulose acetate propionate, dibutyl tartrate, dimethyl phthalate and shellac resins.

8. The thermal transfer sheet according to claim 7, wherein the content of said modifying agent is 0.5% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

9. The thermal transfer sheet according to claim 7, wherein the coverage of the components constituting the adhesive layer is 0.05 to 0.3 g/m<sup>2</sup> on a dry basis of the adhesive layer.

10. A thermal transfer sheet comprising: a substrate; and an adhesive layer and a dye layer provided in that order on at least one side of the substrate, wherein  
said adhesive layer comprises a polyvinylpyrrolidone resin,  
(A) at least one component selected from the group consisting of polyurethane resins and acrylic polyol resins that are soluble in a mixed solvent composed of methyl ethyl ketone and isopropyl alcohol at a weight ratio of 1 : 1 and, even when diluted to a solid content of 5% by weight, do not gel, and

(B) at least one component selected from the group consisting of isocyanates, blocked isocyanates, and aluminum chelating agents that are soluble in a mixed solvent composed of methyl ethyl ketone and isopropyl alcohol at a weight ratio of 1 : 1 and, even when diluted to a solid content of 5% by weight, do not gel.

11. The thermal transfer sheet according to claim 10, wherein said adhesive layer further comprises a modification product of a polyvinylpyrrolidone resin.

12. The thermal transfer sheet according to claim 10, wherein

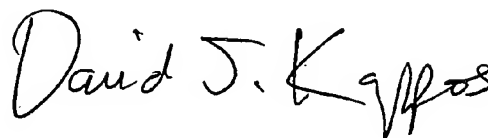
the content of at least one component selected from said group (A) in said adhesive layer is 1% by weight to 30% by weight based on the total solid content of the components constituting the adhesive layer, and

the content of at least one component selected from said group (B) in said adhesive layer is 1% by weight to 10% by weight based on the total solid content of the components constituting the adhesive layer.

13. The thermal transfer sheet according to claim 10, wherein the coverage of the components constituting the adhesive layer is 0.01 to 3.0 g/m<sup>2</sup> on a dry basis of the adhesive layer.

Signed and Sealed this

Twentieth Day of April, 2010

A handwritten signature in black ink, reading "David J. Kappos". The signature is written in a cursive, flowing style with a large initial "D".

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